**Express Mail Receipt No. ED638708395US**
**Deposited on July 11, 2005**

OIPE JC
JUL 11 2005
PATENT & TRADEMARK OFFICE

*PATENT*
**Dkt. STL11421**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: **Clark E. Lubbers and Randy L. Roberson**
Assignee: **SEAGATE TECHNOLOGY LLC**
Application No.: **10/658,982** Group No.: **3728**
Filed: **September 10, 2003** Examiner:
For: **ADAPTIVE MAPPING**

**Mail Stop Petition**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, VA 22313-1450**

## PETITION TO MAKE SPECIAL FOR NEW APPLICATION UNDER M.P.E.P. § 708.02, VIII

### 1. Petition

Applicant hereby petitions to make this new application, which has not received any examination by the Examiner, special.

### 2. Claims

All the claims in this case are directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then applicant will make an election without traverse as a prerequisite to the grant of special status.

### 3. Search

A search has been made by professional searcher in the following:

Field of search: Memory
Class/Subclasses
711/114, 170, 202 & 203

Database
Class/Subclasses
707/100 and 102

A copy of the search report from Mark Spector, professional searcher, is submitted herewith.

### 4. Copy of references

All of the references most closely related to the subject matter encompassed by the claims are of record or are listed in the Supplemental Information Disclosure Statement which accompanies this Petition, in accordance with M.P.E.P. 708.02VIII(D).

07/13/2005 SSITHIB1 00000166 10658982
01 FC:1464 130.00 OP

Also included with the Supplemental Information Disclosure Statement is Form PTO/SB/08A (Substitute for Form PTO-144) and copies of the references listed therein.

**5. Detailed discussion of the references**

There is submitted herewith a detailed discussion of the references, which discussion particularly points out how the claimed subject matter is distinguishable over the references.

Also attached is an Information Disclosure Statement.

**6. Fee**

The fee required by 37 C.F.R. 1.17(h) $130.00 is to be paid by:

Authorization is hereby made to charge the amount of $130.00 to Credit card as shown on the attached credit card information authorization form PTO-2038.

Charge any additional fees required by this paper or credit any overpayment to Deposit Account No. 06-0540. A duplicate of this paper is attached.

Respectfully submitted,

Date: 7/11/2005

Mitchell K. McCarthy, Registration No. 38,794
Randall K. McCarthy, Registration No. 39,297
Fellers, Snider, Blankenship, Bailey & Tippens, P.C.
100 North Broadway, Suite 1700
Oklahoma City, OK 73102-8820
Telephone: 405-232-0621
Fax: 405-232-9659
Customer No. 33900

OIPE
JUL 11 2005
PATENT & TRADEMARK OFFICE
JC99

**EXPRESS MAIL RECEIPT NO. ED638708395US**
**DEPOSITED ON JULY 11, 2005**

*PATENT*
**DKT. STL11421**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: **Clark E. Lubbers and Randy L. Roberson**
Assignee: **SEAGATE TECHNOLOGY LLC**
Application No.: **10/658,982** Group Art Unit: **3728**
Filed: **September 10, 2003** Examiner: **Unknown**
For: **ADAPTIVE MAPPING**

**Mail Stop Petition**
**Commissioner for Patents**
**P. O. Box 1450**
**Alexandria, VA 22313-1450**

**DETAILED DISCUSSION OF THE REFERENCES IN SUPPORT OF PETITION TO MAKE SPECIAL FOR NEW APPLICATION UNDER M.P.E.P. § 708.02, VIII**

Sir:

The embodiments of the present invention as claimed can be at least characterized without limitation by the following recited features:

Independent Claim 1

*A method of maintaining a directory for a data container comprising[:] determining that a sparse directory structure is to be changed; and reconstructing said sparse directory structure into a fully populated directory structure.* (Claim 1, emphasis added)

Independent Claim 16

*A data storage system comprising[:] a data storage container; and a controller that defines a sparse directory structure for said data container, determines that said sparse directory structure is to be changed, and reconstructs said sparse directory structure into a fully populated directory structure.* (Claim 16, emphasis added)

It is respectfully submitted that none of the references of record disclose, teach or suggest the claimed apparatus and method as featured by claims 1-11 and 16-28.

U.S. Patent No. 6,356,897 to Gusack ("Gusack '897") discloses a computer implemented method of linking information arranged in a series of relational tables. Each table is assigned a unique domain of indicia for sorting and insertion purposes. A central linking table is formed to link fields among the various tables.

U.S. Patent No. 6,173,291 issued to Jenevein ("Jenevein '291") discloses a method and apparatus for managing files in a computer environment. Lost or corrupted files are copied when file system information associated with such files is corrupted or destroyed. A sector-by-sector scanning and filtering process is carried out in an attempt to identify sectors from the lost files, and the information collected from the scanning and filtering process is used to reconstruct directory trees of files for display to the user.

U.S. Patent No. 6,117,185 issued to Schmidt ("Schmidt '185") discloses a skip list data structure and associated compiler in a computer system. The skip list is disclosed as storing various properties of a computer program at different points within the flow thereof for dataflow analysis. A routine is further disclosed to ensure that the skip list structure is not used inefficiently as a result of initialization.

U.S. Published Patent Application No. US2003/0079102 A1 to Lubbers et al. ("Lubbers '102") discloses a data storage system with a logical disk mapping structure that generates a predecessor logical disk data structure that is a snapshot of a successor (original) logical disk data structure. The snapshot is generated by arranging metadata to map the predecessor logical disk to user data stored on physical media.

It is respectfully submitted that all of the above references, as well as the remaining references of record, are silent with regard to determining that a sparse directory structure is to be changed, and reconstructing said sparse directory structure into a fully populated directory structure in response thereto as generally featured by pending claims 1-11, 16-28.

Moreover, one skilled in the art would not be motivated from the above references or the remaining references of record, alone or in combination, to arrive at the claimed subject matter or at an obvious variant thereof.

It is submitted that all of the elements set forth in M.P.E.P. §708.02 subsection VIII have now been provided in this petition to make special. It is requested that this petition be granted and that the presented claims be examined as soon as possible.

Respectfully submitted,

Date: 7/11/2005 By: _____

Mitchell K. McCarthy, Reg. No. 38,794
Randall K. McCarthy, Reg. No. 39,297
Fellers, Snider, Blankenship, Bailey & Tippens
100 North Broadway, Suite 1700
Oklahoma City, OK 73102-8820
Telephone: (405) 232-0621
Fax: (405) 232-9659
Customer No. 33900

FROM: Mark Spector 4452 South 36th ARL VA 22206 midmuzk@aol.com 703.3798824
FOR: Mitchell K. McCarthy ESQ Fellers Snider, Bank1Tower 100N B'Way #1700 OK 73102
405.2320621 9659fax MMcCarthy@fellerssnider.com DAnderson@fellerssnider.com

RE: Adaptive Mapping STL11421

Dear Mr. McCarthy: 5.25.05

In response to your letter of 5.03, a patent search has been conducted regarding the three independent claims of STL11421, and in particular for computer memory virtual storage directory structures, for a sparsely filled data container, with a linked list, doubly linked list, skip list, or other non-fully populated list technique, which may be converted to a look-up table directory by reconstructing the directory when the directory becomes populated. A sparse directory structure can be reconstructed into a fully populated directory structure, and the fully populated directory structure can be reconstructed into a sparsely populated directory structure.

A search in US Patents was conducted in:
Memory, Class 711, Subclasses: 114, 170, 202, 203
Database, Class 707, Subclasses: 100 and 102.

US Patent Examiner J.Song au2188, was consulted.

The following 20 US Patents & Pubs, disclose reconstructed directories, skip and linked lists, as noted.

6895467 Lubbers : "Using this *split directory approach,* a large storage volume that is *sparsely populated* with allocated storage, the structure shown in FIG. 5 efficiently represents the allocated storage while *minimizing data structures for unallocated storage.*" Lubbers also has US20030079102 (virtual storage).

6789156 Waldspurger : "Another alternative data structure would be the class of lists including *linked lists (sorted or unsorted), skip lists, or even simple arrays.*"

6745189 Schreiber : "This recursive data architecture *enables complex hierarchies* of data objects and enables data inheritance. Navigation through an HDL may be forward, backward, up, or down, through a navigational tree. The HDL may be broken apart and rearranged in any manner desired."

6505283 Stoney : "Preferably, the first and second lists *are linked list data structures.* More preferably, the first and second lists are merged. In a particularly preferred form, the first and second lists take the form of a *merged skip-list.* "

6445680 Moyal : "Claim1...*a linked list containing an ordered list of pointers*..."

6356897 Gusack : "An indexing system and linking method ...The records are bi-directionally linked to each other via separate, central linking table indexes wherein *each index record is structured with linking fields* for storing sets of alphanumeric indicia belonging to records in the data set. ..*Each central linking table index is further generalized to provide multiple arrays of linking indicia* in indexing fields such that records from the data tables may be linked together as a data cluster. "

6173291 Jenevein : "Once the scanning and filtering process is complete, the process moves to step 86, wherein the information collected during the scan is used to *reconstruct directory trees of files* for display to the user. Briefly, this may include determining the number of sectors per cluster (SPC) and the cluster base (CB), for each partition or volume, if such information is not available from the boot sectors, and partition sectors or other file system data structures. Furthermore, the directories are checked to determine whether they are part of the current directory or folder structure (i.e. that they are not deleted or left from prior device formats). The chances of recovering each file is assessed based on whether cluster allocation information is available and appears valid."

6151685 Li : "Using the main directory, the data blocks in each segment listed on the damaged segment directories list are identified and their corresponding segment directory entries are reconstructed. After the segment directory is reconstructed, it is removed from the list of damaged segment directories. The *reconstructed segment directories are used in a space reclamation procedure* wherein space in the segments containing old data are reclaimed and current data in each segment is written to a different segment."

6117185 Schmidt : "Skip list data storage"

5956723 Zhu : "Claim1. A method of maintaining identifier information in a computer system ...a second storing step of storing the unique identifiers of remaining constituent elements whose first parts match the first part of the *stored unique identifier as a linked list* of second parts, each member of the linked list including *a first pointer* pointing to the stored unique identifier first part and a second pointer pointing to a next member of the linked list, whereby, by maintaining the unique identifiers as a linked list of second parts, a memory storage requirement for maintaining the identifier information *is less than a memory storage requirement* for storing an entire unique identifier for each constituent element. "

5933592 Lubbers : "FIG. 3 illustrates a data processing system having redundant RAID array controllers for running RAID array management software for *reconstructing data blocks*..." Lubbers also has US5826001 (reconstructing data blocks).

5832526 Schuyler : "The information recorded in step 535 may include the file size, the number of fragments and their locations, the file name, the file's last revision date & time and other attributes of FILE-1. These may be used for *reconstructing the lost directory pointer* 210 and other data of the damaged directory structure 151'. Similar information may be used for reconstructing fragmented files such as FILE-2."

5761501 Lubbers : "stacked *skip list* data structures."

5671406 Lubbers : "...*skip list* insertion sort on a singly *linked list* of elements..."

5659739 Lubbers : "*skip list* data structures"

5566328 Eastep : "*Reconstructing directory pathnames* from file handles in a computer system ...*Link Ids are associated with file handles in a directory structure* in a computer operating system..."

5359724 Earle : "Depending upon the *sparseness of the data*, different types of upper level structure may be used. Both the variable data block size and the choice of pointer structure may be used to balance the memory required against the speed of retrieval."

4827462 Flannagan : "Claim1. ...*a first plurality of directory header control blocks being logically linked in a linked list,* each said directory header control block having first and second portions..."

20050055529 Lubbers : "Adaptive Mapping."

20030079102 Lubbers : "Claim1...*populating* the LMAP for the predecessor logical disk with RSD *pointers*..."

During the course of this search, I uncovered this foreign reference.

JP2004038928A2: SYSTEM AND METHOD FOR DETERMINING CHANGE BETWEEN TWO SNAPSHOTS AND TRANSMITTING THE CHANGE TO DESTINATION SNAPSHOT 1 page
Inventor: FEDERWISCH MICHAEL L; OWARA SHANE S; MANLEY STEPHEN L; KLEIMAN STEVEN R;
Assignee: NETWORK APPLIANCE INC
Published / Filed: 2004-02-05 / 2003-03-19
Application Number: JP2003000075430
IPC Code: G06F 12/00; G06F 3/06;
Priority#: 2002-03-19 US2002000100967 2002-03-19 US2002000100950
Abstract: PROBLEM TO BE SOLVED: To enhance versatility and utility of a snapshot duplication means. SOLUTION: A system and a method are for performing remote asynchronous duplication, namely, mirroring of change of source file system snapshots to a duplicated file system at a destination by identifying a block changed by difference of block volume numbers identified in the case of scanning a logical file block index of each snapshot by utilizing scan (by a scanner) of blocks constituting two versions of snapshots of the source file system. A tree of the block regarding the file is checked, a pointer without changes between versions is bypassed and proceeded downward and changes of *hierarchy of trees are identified and the changes are transmitted* to a destination mirror, namely, a duplicated snapshot. At the destination, the destination snapshot is updated by using source change. Every deleted or changed inode already existing on the destination is transferred to a temporary directory, namely, "momentary" directory and when it is reused, *it is re-linked with the reconstructed duplicated snapshot directory*.

In the time allotted, I've selected here what struck me as most relevant from over 10,000 memory, address and schema references, but as in any patent search, this one could be continued or extended. ~12hrs@30

Thank-You Mr. McCarthy